

# MammoSite



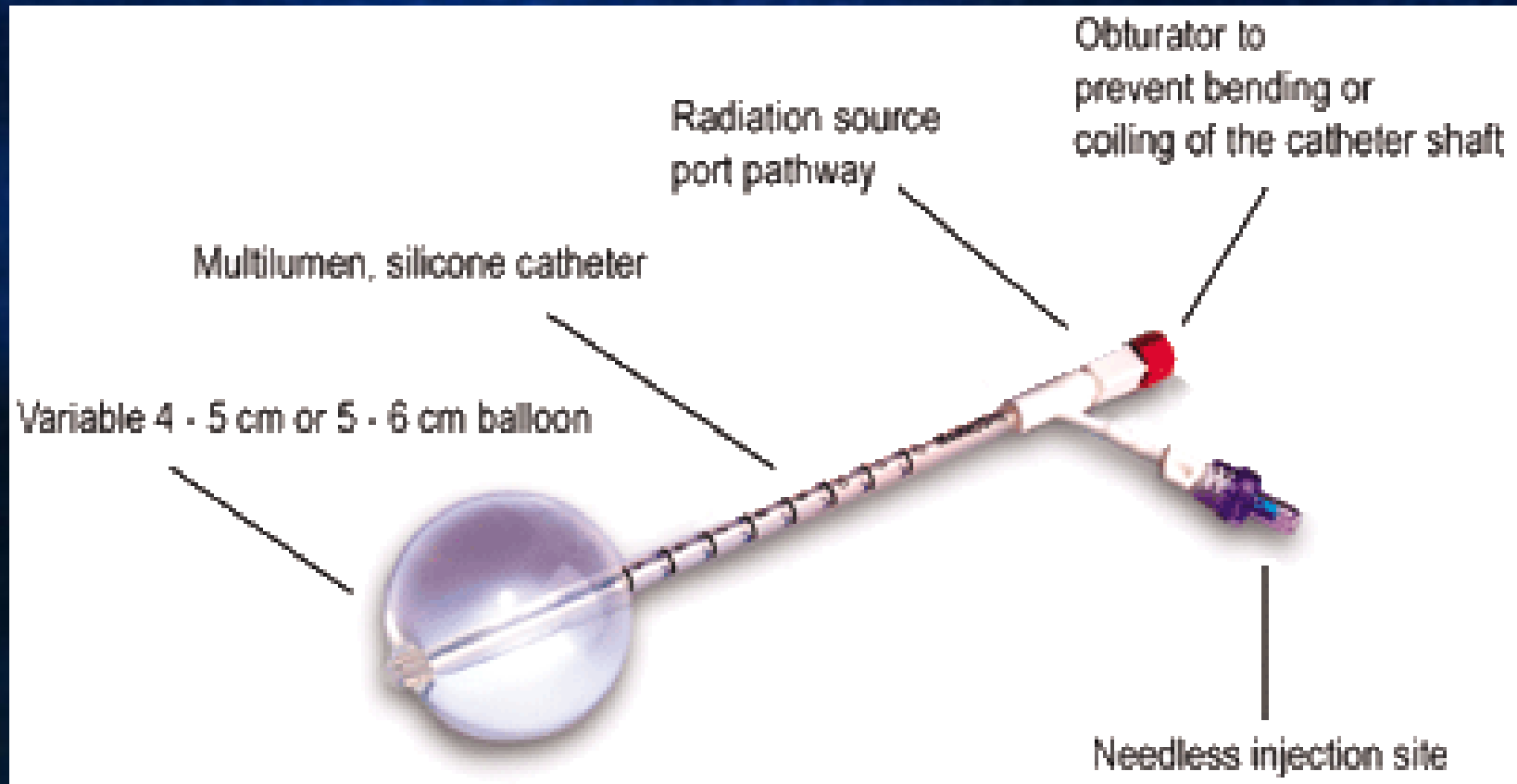
# Breast Cancer Treatment

- Breast conservation therapy - an alternative to mastectomy for patients with Stage I and II breast cancer
- Current standard of care:
  - lumpectomy
  - whole-breast external beam radiotherapy (EBRT), five to seven weeks

# Patterns of Recurrence

- Ipsilateral breast recurrences are most frequently observed in the immediate vicinity of the primary site
  - Treatments? Whole breast necessary?
  - Get the dose in quicker? (Accelerated partial breast therapy, brachytherapy?)
  - Currently, multi-catheter based interstitial brachytherapy implants are the best-studied means of accelerated partial breast RT.

## The MammoSite Radiation Therapy System (Proxima Therapeutics, Alpharetta, GA)



## The MammoSite Radiation Therapy System

A balloon-tipped catheter is inserted into the resection cavity, either at the lumpectomy or up to 10 weeks after surgery, and inflated to a diameter of 4–5 cm. Inflating the balloon shapes and compresses the tissue adjacent to the cavity into a nearly spherical shell surrounding the balloon.

The initial efficacy trial of the MammoSite used a single high-dose-rate (HDR) dwell position at the center of the balloon.

The result is a conceptually and procedurally simple technique that delivers a highly reproducible geometry for breast brachytherapy.

# MammoSite Implanted

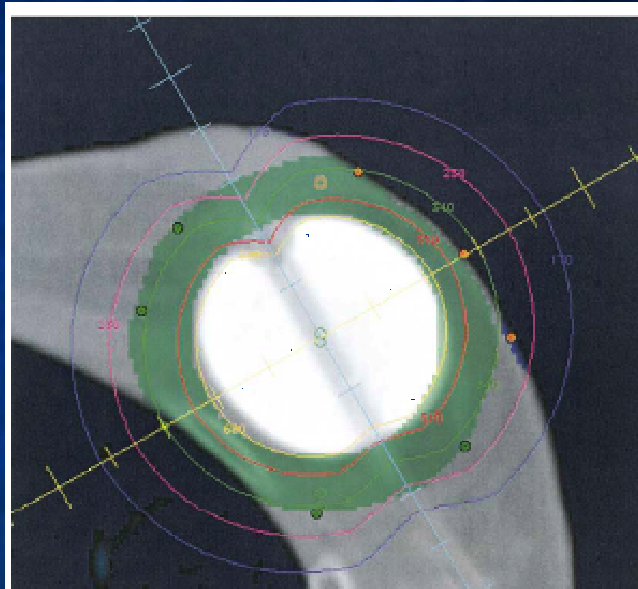
Once in place, the balloon is inflated with saline to fill the cavity and remains inflated for the entire time the patient is receiving radiation therapy. After the balloon is inflated, the catheter exit site is dressed and the patient may go home for a few days to recover

# MammoSite Implanted

The patient returns for one to five days of treatment on an outpatient basis, where the HDR Ir-192 is inserted into the inflated balloon. The prescribed dose of internal radiation is delivered directly to the lumpectomy site. Typically this procedure is done twice a day for approximately 15 minutes.

When the course of treatment is complete, the balloon catheter is deflated and removed.

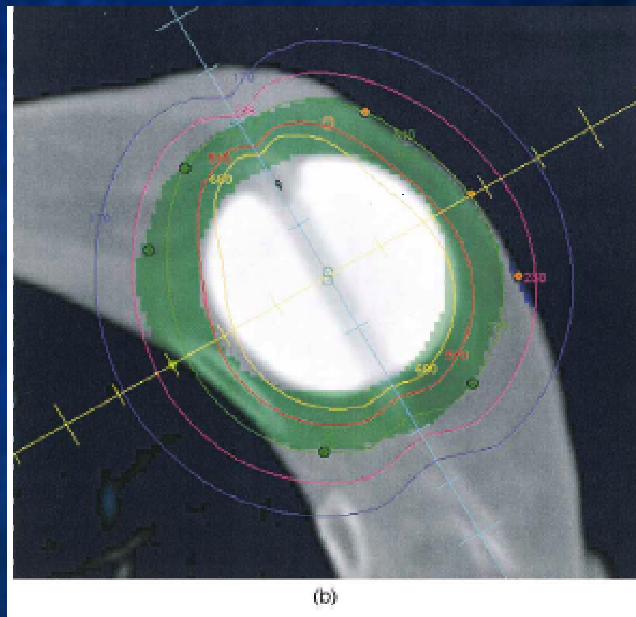
# Simple Dosimetry



Single dwell position 340 cGy prescribed at 1 cm from balloon



# TPS Dosimetry



TPS constrained = multiple dwell positions

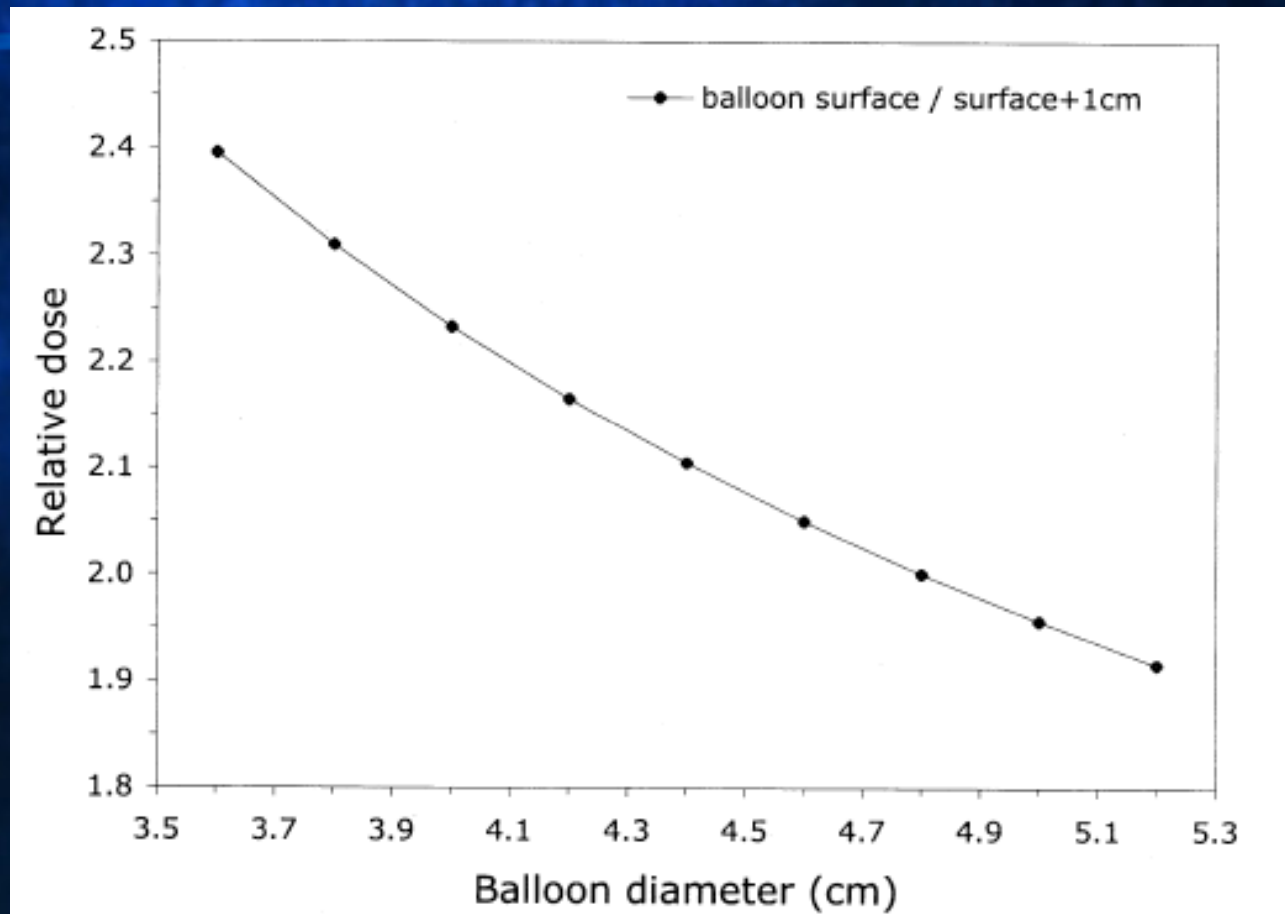
- Avoid skin
- Egg-shaped isodose distribution.

# QA Independent Verification

## AAPM TG59

- Independent verification of radiation treatment planning system (RTP)
- intercepts human errors (typographic mistakes during data entry)
- Verification can also check RTP algorithm and calibration data
- Verification can be done manually or with simple computer programs

# Ratio Surface: 1cm Doserate



# Treatment Planning

- Prescription dose per fraction and total dose at a distance from the balloon surface is written, signed and dated on the patient chart by the radiation oncologist (Authorized User)
- Computerized Treatment Time is generally calculated by a physicist or dosimetrist
- Doubled checked by a second physics team member
- The calculation and double check are documented in the patient chart.

# Complications

Published in 2005:

Medical University of South Carolina 2002-2003  
-Infections, skin toxicity, seromas -Three (8%)

Radiation Therapy Oncology Group

- |                                      |                |
|--------------------------------------|----------------|
| Grade 2 toxicity-                    | Two (5.4%)     |
| Grade 3 toxicity-                    | One (2.7%)     |
| - Wound infections -                 | Six (16.2%)    |
| - Seromas -                          | Twelve (32.4%) |
| - Catheter failures due to leak -    | Two (5.4%)     |
| - Catheter failures due to rupture - | Three (8%)     |

# Quality Assurance

- The dose rate calibration is performed and reported by NIST or ADCL.
- The Written Directive is completed and filed in the treatment chart and given to physicist for calculation of treatment time.
- The treatment time is calculated according to the prescription dose and dose rate (incorporating decay) as calibrated by NIST or ADCL.
- The treatment time calculation is double checked and properly documented.
- The patient's identity is checked prior to treatment delivery using at least two different methods.
- The treatment site is verified according to the surgeon's report.
- The treatment delivery time per fraction is monitored, using proper timer device(s).
- The treatment delivery record is properly documented.
- The patient post brachytherapy survey is documented

## Quality Management Program (QMP)

1. That prior to administration, a written directive, signed and dated by an authorized user, is prepared for each applicable administration. A written directive for MammoSite radiotherapy means an order, in writing, for a specific patient, dated and signed by an authorized user prior to administration of radiation. It must include:
  - the radioisotope,
  - the treatment site,
  - source strength (corrected for decay), and
  - exposure time (or equivalently, the total dose).

## Quality Management Program (QMP)

2. That prior to each administration, the patient is identified by more than one method as the individual named in the written directive.
3. That final plans of treatment and related calculations are in accordance with the respective written directive.
4. That each administration is in accordance with the written directive.
5. That any unintended deviation from the written directive is identified and evaluated, and appropriate action taken.



# Conclusion

- As a High Dose Rate treatment utilizing an HDR unit, a MammoSite Program needs appropriately written guidelines
- Treatment are to be handled by appropriately trained professionals
- As of 2005, EBRT is still considered to be the standard of care for breast cancer treatment.

# MammoSite



*Thank You*